PERFORMANCE PIPE
A Division of Chevron Phillips Chemical Company LP

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HDPE and PVC:

Working Pressure Rating and Fatigue Life

Design Fatigue Life (Years) at Velocity of 4 fps at 1 cycle every 15 minutes

PVC | PE4710 HDPE

Pumping Pressure (psi)	DR14 PC305	DR18 PC235	DR21 PC200	DR25 PC165	DR9 PC250	DR11 PC200	DR13.5 PC160	DR17 PC125	DR21 PC100
25	>100	71	64	36	>100	>100	>100	>100	>100
50	86	43	26	17	>100	>100	>100	>100	>100
75	59	31	21	14	>100	>100	>100	>100	>100
100	56	29	17		>100	>100	>100	>100	>100
125	54	27			>100	>100	>100	>100	>100
150	50	26			>100	>100	>100	>100	
175	46				>100	>100	>100		
200	43				>100	>100			
225	40				>100	>100			
250					>100				

Pumping Pressure exceeds Working Pressure Rating, not suited for use. Design Fatigue Life less than 50 years.

- Most municipal applications have recurring surges that must be accounted for by calculating the pipe's Working Pressure Rating (WPR).
- The Working Pressure Rating for HDPE pipe equals its Pressure Class (see AWWA C906 and M55). For PVC, the Working Pressure Rating is always less than the Pressure Class since the anticipated surge magnitude is subtracted from PVC's Pressure Class.
- BUT Working Pressure Rating is not the only factor that needs to be considered. The Fatigue Life must be evaluated.
- Frequent repetitive surges (common to all Distribution and Force Main pipes) can cause fatigue failure in PVC pipes over time. Studies have shown that HDPE pipes are not susceptible to fatigue under typical municipal field conditions.
- Because of its low fatigue resistance, an important part of design for PVC pipe is an evaluation of fatigue life as given in AWWA C900-07.
- Flow velocity is the most significant factor in fatigue life. Most systems operate at velocities of 2 fps to 4 fps. Normally, velocity will vary throughout a piping system. Prudent engineering suggests using the highest velocity that may occur.
- The chart gives the estimated design fatigue life for PVC and HDPE pipe based on a two-to-one safety factor.
- Light blue indicates an acceptable Working Pressure Rating and more than 50 year fatigue life for PVC.
- All of the HDPE pipe sizes significantly exceed 100 years fatigue service life.

When Performance Matters Rely on Performance Pipe

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Performance Pipe, a division of Chevron Phillips Chemical Company LP | 5085 W. Park Blvd | Suite 500 | Plano, TX 75093 | Phone: 800-527-0662 | Fax: 972-599-7348